

save event triggered upon detecting a frame transmission that occupies the channel. In other embodiments, at least one of the devices 100, 112, 114 may perform other functions instead of entering the power-save mode. Such other functions may include operating in another wireless network, for example.

[0046] FIG. 3B illustrates an embodiment where the access node 100 provides the terminal device(s) 112, 114 with a set of rules to apply in connection with overlapping transmissions. The rules may be based on measurements carried out by the access node 100 itself or measurements carried out by the terminal devices 112, 114. Let us assume a situation where the terminal device 112 has measured that it cannot ensure correct reception of frames from the terminal device 114 when the access node 102 is transmitting. This may be based on measurements described above in connection with block 304, e.g. the terminal device may perform SIR estimations for signals measured from the access node 102 and from the terminal device 114. The terminal device may then report to the access node 100 that it cannot detect frame transmissions from the terminal device 114 while the access node 102 is transmitting. The access node 100 may then create a rule in block 320, the rule defining that the terminal device 114 shall not carry out overlapping transmissions to the terminal device 112 while the access node 102 is transmitting. The access node may create the same rule on the basis of another criterion, e.g. based on known locations of the terminal device 112 and the access node or through measurements the access node 100 has made on its own. The access node may create other rules in block 320.

[0047] In step 322, the access node 100 transmits the set of rules to the terminal devices of the wireless network 120. The set of rules may comprise the above-mentioned rule that instructs the terminal device 114 to which the rules is addressed to refrain from overlapping transmissions towards the terminal device 112 identified in the rule when the access node 102 also identified in the rule is transmitting. The terminal device 114 may acknowledge the detection of the access node 102 and compliance with the rule in the above-described manner. The terminal device 114 may then determine that transmission to another device, e.g. another device of the wireless network 120 or a device of another wireless network, is possible while the access node is transmitting (block 324). Upon detecting a frame transmission 314 of the access node 102, the terminal device 114 may make a decision not to transmit to the terminal device 112 because of the rule and, further decide to carry out frame transmission to the other device (step 324) during the frame transmission 314.

[0048] In another embodiment, the terminal device 114 may determine at least one rule without the access node, e.g. the terminal devices 112, 114 may exchange information necessary to create the rules according to a scheme described in connection with FIG. 5 below.

[0049] FIG. 4 illustrates an embodiment where one of the terminal devices 112, 114 of the wireless network 120 is not able to detect frame transmissions from the device with which the overlapping transmissions are prohibited by the access node 100. Referring to FIG. 4, upon receiving the frame instructing the terminal device 114 to refrain from frame overlapping transmissions with respect to the access node 102 in step 306, the terminal device 114 may determine that it is not able to detect frame transmissions from the access node 102 (block 400). Block 400 may be based on determining that the terminal device 114 has not detected any frames compris-

ing an identifier of the access node 102 or that the terminal device 114 has not detected any frames comprising an identifier of the access node 102 within a determined time interval. As a consequence, upon carrying out block 400, the terminal device 114 transmits a response to the frame received in step 306, wherein the response indicates that the terminal device 114 is not able to detect frame transmissions from the access node 102. Upon detecting that at least one terminal device cannot detect the identified interfering device 102 and may, thus, carry out transmissions that overlap with the interfering device (block 408), the access node 100 may stand by to receive frames from such a terminal device. As a consequence, the access node 100 may prevent the power-save mode (block 404) or prevent operation in another wireless network during the transmission (step 314) carried out by the interfering device. The terminal device 112 able to detect the frame transmissions from the interfering device may prevent the overlapping transmissions with the interfering device (block 406).

[0050] In an embodiment, the access node 100 may determine per each terminal device whether or not a device of the other wireless network that allows overlapping transmissions actually blocks the transmissions with the access node. For example, the access node 102 may block the transmissions between the access node 100 and the terminal device 112 but not between the access node 100 and the terminal device 114. As a consequence, the access node 100 may instruct the terminal device 112 to refrain from transmissions overlapping with transmissions of the access node 102 but allow frame transmissions with the terminal device 114 such that they overlap with transmissions of the access node 102.

[0051] The process of any one of FIGS. 2 to 4 may be carried out periodically and/or upon detecting a change in the interference scenario. In a case where it is determined that the terminal device(s) is/are highly mobile, the procedure may be disabled. The mobility may be determined on the basis of a measured speed of the terminal device or by the time interval the terminal device stays in one wireless network. If the terminal device changes the wireless network more rapidly than a determined threshold, the process may be disabled.

[0052] FIG. 5 illustrates an embodiment that may be used in connection with peer-to-peer transmissions in a wireless network, e.g. transmissions between the terminal devices 112, 114 of the same wireless network 120. Referring to FIG. 5, the procedure comprises block 500 in which the terminal devices both detect that overlapping transmissions with an apparatus of another wireless network are allowed. Block 500 may be similar to block 300 or block 200 with respect to how the detection is made. Each terminal device 112, 114 may then carry out measurements and autonomously determine whether one or more devices, with which the overlapping transmissions are allowed, causes interference that blocks correct reception of frames in the terminal device 112, 114. The determination may be based on the signal-to-interference ratio estimation and comparison with the threshold, for example. The signal to-interference ratio estimation may be carried out by measuring a signal received from the terminal device 114 and interference measured from a device of the other wireless network with which the overlapping transmission is allowed. In step 502, the terminal device 112 transmits a frame to the terminal device 114, the frame comprising a first set of identifiers comprising identifier(s) of that or those devices that the terminal device 112 determines to block correct reception of frames from the terminal device 114.